Santa Clara Valley Water District℠

Water Use Efficiency Program

ANNUAL REPORT

Fiscal Year 2005-2006

Santa Clara Valley Water District SM

Our Mission

The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through watershed stewardship and comprehensive management of water resources in a practical, cost-effective, and environmentally sensitive manner.

About the Santa Clara Valley Water District

The Santa Clara Valley Water District is the primary water resources agency for Santa Clara County, California. It acts not only as the county's water wholesaler, but also as its flood protection agency and is the steward for its streams and creeks, underground aquifers and District-built reservoirs.

As the county's water wholesaler, the water district makes sure there is enough clean, safe water for homes and businesses. As the agency responsible for local flood protection, the water district works diligently to protect Santa Clara Valley residents and businesses from the devastating effects of flooding.

Our stream stewardship responsibilities include creek restoration and wildlife habitat projects, pollution prevention efforts and a commitment to natural flood protection.

Front row, seated (from left to right): Sig Sanchez, Rosemary Kamei, Gregory Zlotnick. Back row, standing (from left to right): Joe Judge, Tony Estremera, Larry Wilson, Richard Santos.

Board of Directors

Rosemary Kamei District 1

Joe Judge District 2

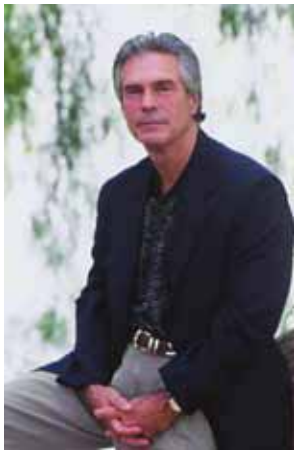
Richard P. Santos District 3

Larry Wilson District 4

Gregory A. Zlotnick District 5

Tony Estremera At Large

Sig Sanchez At Large



From the CEO

Nearly two years ago, the Santa Clara Valley Water District charted a course towards becoming "Cleaner, Greener and Leaner" – managing our resources to their maximum benefit and efficiency. The District's fifth annual Water Use Efficiency Program Annual Report for Fiscal Year (FY) 2005/06 presents some significant steps toward achieving this goal and a hopeful vision for water supply management in the future.

In FY 05/06, the District continued to be a leader by promoting innovative and cost-effective water use efficiency programs. These water conservation and water recycling programs accounted for 53,300 acre-feet (af) of water savings, supplying approximately 14% of the District's total water for this fiscal year, making it a key part of the District's water supply portfolio and moving the District in the direction of becoming Cleaner, Greener and Leaner.

As the issue of global climate change gained more prominence domestically and internationally, the District has been on the forefront of educating the public and other agencies about the connection between water, energy and air pollution, emphasizing that every drop of water saved means reduced energy demand and reduced air pollutants emitted. Water Use Efficiency staff will continue to educate the community about this important topic in the years ahead.

This fiscal year was also one of continuing to build partnerships in the region, with the District taking part in developing the San Francisco Bay Area's and Pajaro River Watershed's Integrated Plans (IRWMP). These documents bring a new regional, multi-agency perspective to the Bay Area's long-term water resources planning, which will help make this and all of the participating agencies more Cleaner, Greener and Leaner.

From the Office of the CEO
Stanley M. Williams
Chief Executive Officer
Santa Clara Valley Water District

Water Use Efficiency Unit of the Santa Clara Valley Water District, managed by Hossein Ashktorab, comprises water conservation, water recycling and desalination. Also pictured: Melanie Richardson, Assistant Operating Officer.

Water Utility Enterprise

Walt Wadlow Chief Operating Officer

Water Supply Management Division

Keith Whitman Deputy Operating Officer
Melanie Richardson Assistant Operating Officer

Water Use Efficiency Unit Staff

Hossein Ashktorab Unit Manager
Jerry De La Piedra Senior Water Conservation Specialist
Kurt Elvert Water Conservation Specialist I
Kevin Galvin Water Conservation Specialist II
Pam John Senior Civil Engineer
Shing Kong Water Conservation Specialist I
Jeannine Larabee Water Conservation Specialist II
Karen Morvay Water Conservation Specialist II
Alice Ringer Program Administrator
Robert Siegfried Assistant Civil Engineer II (Agricultural)
Toni Vye Senior Office Specialist
Ray Wong Associate Engineer (Civil)
Stanley Zhu Senior Civil Engineer

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District's WUE program Interns, from left to right, Sven Rosengreen, Lewis Reed, Catherine Cox, Justin Finch, Linda Liu, Allie Kenyon, Elizabeth Sarmiento, Kelly Jost.

Special thank you to Catherine Cox and Elizabeth Sarmiento for their photos used in this report.

SUMMARY

The water conservation, water recycling and desalination programs in the Santa Clara Valley Water District's (District) Water Use Efficiency (WUE) Program reduce demand on existing water and energy supplies, helping to defer the costs and environmental impacts of developing additional supplies. These programs also protect the South Bay salt-marsh habitat by reducing freshwater effluent released from wastewater treatment facilities.

Additionally, these programs assist the District in meeting its Board Ends Policy for water supply reliability, water conservation and water recycling. The District Board's policies, in conjunction with the District's 2003 Integrated Water Resources Planning Study (IWRP) and 2005 Urban Water Management Plan (UWMP), require that:

- Water Conservation is implemented to the maximum extent that is practical
- Water recycling be expanded within Santa Clara County in partnership with the community
- A variety of water supply sources are available to minimize risk

The District's Water Use Efficiency programs have increased the reliability of District supplies and reduced the risk of shortages during drought periods. **The District's water conservation and water recycling programs together accounted for approximately 53,300 acre-feet (AF) of water savings per year.** (Note: An acre-foot of water is enough water for two families of five for one year.) With the projected population growth in the Valley, the roles of such programs in offsetting demand for potable water will increase significantly.

The District is evaluating the feasibility of integrating desalination (bay/ocean/brackish water) into regional and local efforts. Current desalination technology is similar to the technology used to lower salts in the advanced treatment of recycled water. Both recycled and desalinated water are drough-proof water supplies that are available when conventional supplies are exhausted.

Right: A WUE Unit intern educates visitors to San Jose's Children's Discovery Museum about water conservation. Far right: Water Use Efficiency staff attend the Marin Desalination Pilot Project Tour.

Some of the District's programs—such as storing water locally or outside the county (banking) and establishing agreements to buy or sell water to other agencies (transfers)—help increase District water supplies in years of shortage, as do District programs aimed at maintaining and maximizing local groundwater storage. Recycled water and desalination provide water supply sources that are largely independent of the weather patterns that affect banking, transfers and groundwater management. The county's first advanced treated recycled water facilities are currently in design. In the future, advanced treated recycled water may be used for enhancing the District's conjunctive water management.

The District maintains that water use efficiency programs, such as water conservation and recycling, be maximized because they are key strategies to minimize overall demand.

This fifth annual report provides an overview of achievements in Fiscal Year 05/06, and a look at current water use efficiency programs, including water conservation, water recycling and desalination. The report also looks at new and future projects and partnerships.

The District's WUE program continued to make education and research a priority. To this end, the District hosted several workshops for the public, including:

- *A Salinity Management Strategy: Water Softener Replacement Rebate Program*

This workshop held July 8, 2005, was jointly sponsored by the Santa Clara Valley Water District and the California State Department of Water Resources. More than 60 interested participants representing 28 entities throughout California got a chance to learn about salinity management issues related to water softeners, on the state and local levels.

- *Water-Energy Workshop*

This workshop, held in August, 2005, was designed to help Bay Area water and wastewater agencies identify opportunities for saving energy without impeding water service to customers. It was sponsored by the California Department of Water Resources, and drew 109 participants representing more than 50 entities from the northern region of the state.

The District also started several important research projects, including:

- *Artificial Turf Feasibility Study*
  The District is conducting research to determine whether there are any adverse water quality impacts (i.e., whether there are any contaminants present in the leachate) due to artificial turf installation.

- *Energy Savings and Water Use Efficiency*
  This year, the District conducted research into the relationship between water use efficiency, energy savings and air quality benefits in the District's region. Staff quantified the savings in energy and reduction of air pollution resulting from water conservation and water recycling. The results of this research should be available in early 2007.

The District's WUE program also promoted water use efficiency at various events, such as the South Bay Home and Garden Show, a three-day event with attendance of about 30,000, and the Guadalupe River Park Grand Opening Event, with an estimated crowd of 50,000 attending the event. As a result of its programs and research, three members of the District's staff were selected to give presentations at the 2006 AWWA Water Sources Conference and at the 2006 AWWA Water Reuse Conference.

The District was also awarded a 2005 Flex Your Power (FYP) Congratulatory Ad and received an Honorable Mention in the 2005 FYP Awards, both of which recognize the unit's commitment to saving energy. The District's WUE program was one of eight recipients out of 600 applicants to receive the congratulatory ad and one of 44 recipients out of 246 applicants to receive the honorable mention. The District's commitment to conserving energy is reflected by its signing of the 2005 FYP Energy Pledge, its certification as a Green Business and its dedication to energy-efficient practices and procedures.

Several new water conservation programs were launched this year, including:

- **Irrigation System Hardware Rebate Program**
  This program, which received $100,000 of grant funding, aims at difficult-to-attain but cost effective landscape conservation on sites with greater than one acre of irrigated landscape. After participating in the District's Irrigation Technical Assistance Program (ITAP), commercial and residential large landscapes are eligible to receive a 50 percent rebate on the cost of ITAP-identified irrigation system upgrades.

- **Weather Based Irrigation Controller (WBIC) Installation Program**
  Launched in December 2005, the grant-funded WBIC Installation Program will help program participants save water, time and money by using local weather conditions to calculate and automatically adjust irrigation schedules to meet the needs of their specific landscapes. The program offers historical and real-time WBIC controllers that manage and change irrigation schedules.

Right: A landscape professional (Heidi Johnson) talks about colorful gardening with native plants to a group attending one of the District's landscape workshops. Far Right: A water softener focus group, hosted by the District.

Energy Savings, Carbon Dioxide Emissions Reductions, and Other Air Quality Benefits from the Santa Clara Valley Water District's Water Use Efficiency Programs

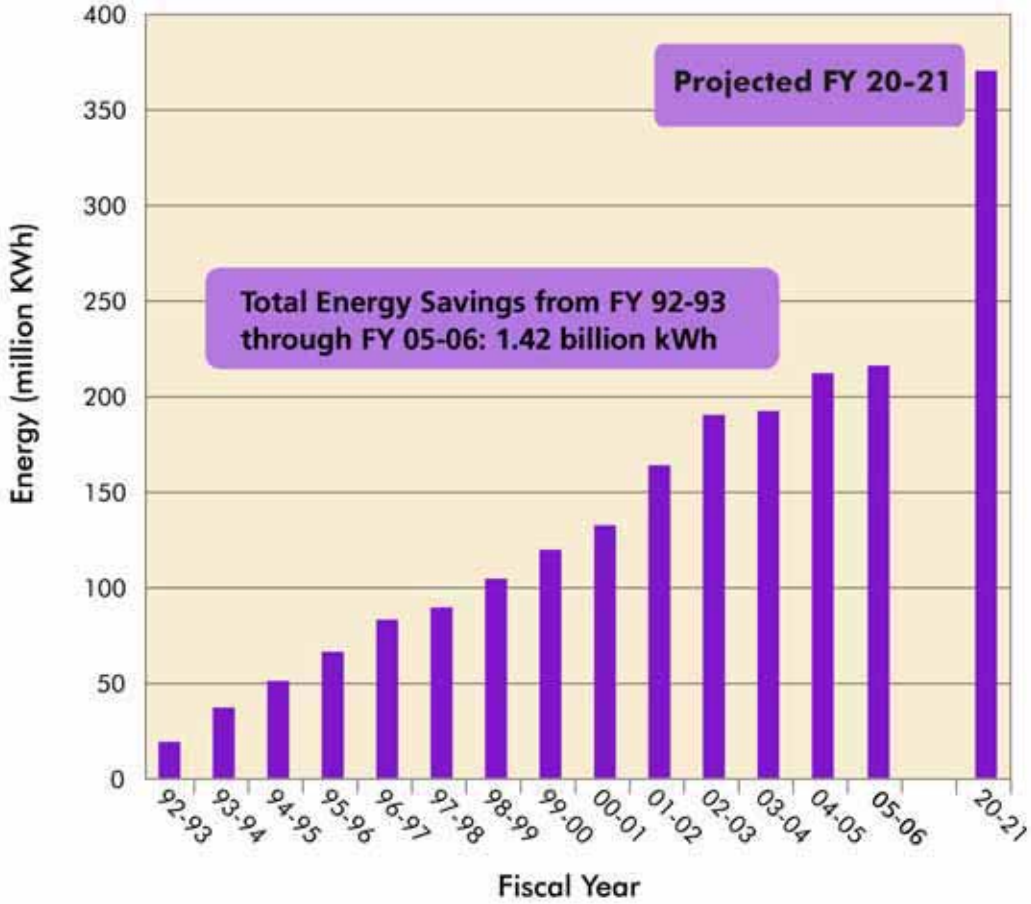
In addition to saving water, water conservation and water recycling programs save energy and reduce air pollutant emissions. Significant quantities of energy are required (and air pollutants generated by energy production) by the water supply chain (i.e., pumping water from its source, conveyance, water treatment, end use, and wastewater treatment). Water conservation and water recycling save energy and reduce air pollution by reducing flow through the water supply chain.

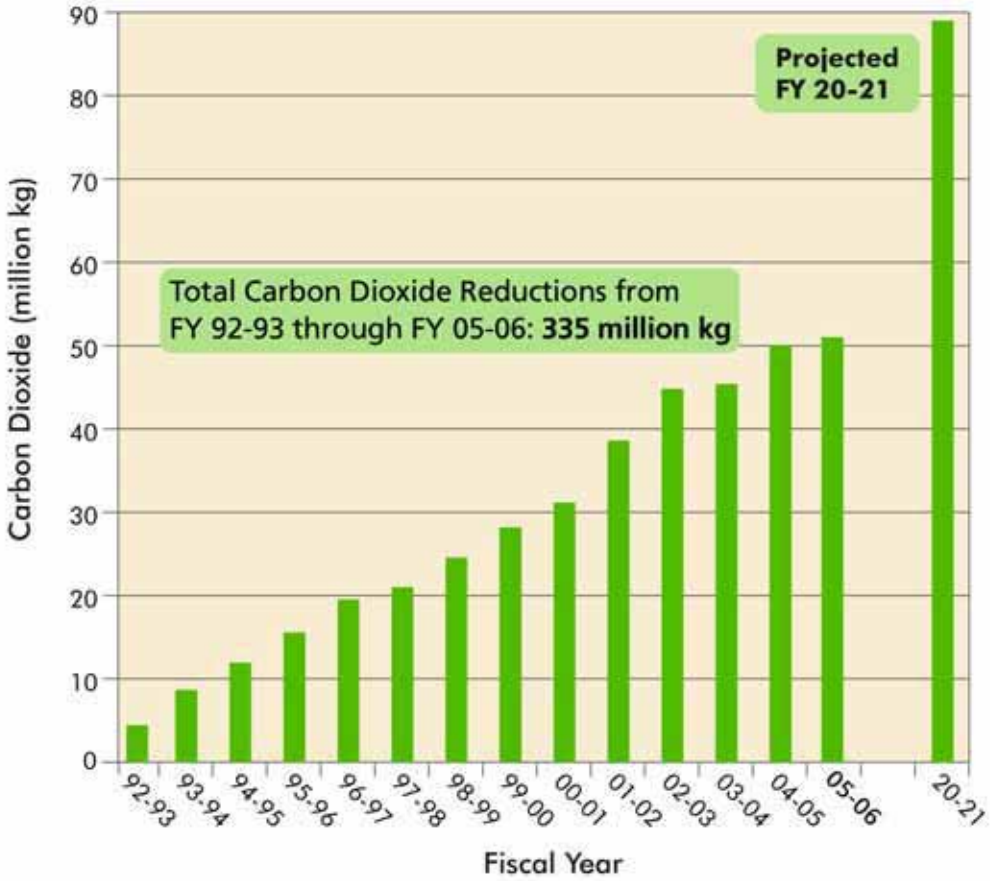
To help meet increasing water demands, the Santa Clara Valley Water District has developed a comprehensive suite of water conservation and water recycling programs that have saved 370,000 acre-feet (AF) of water supplies between fiscal year (FY) 92/93 and FY 05/06.

To estimate the energy saved by the District's water conservation and water recycling programs, the District used the Water to Air Model developed by the Pacific Institute. The model's systems approach for quantifying water-related energy use provides water supply planners with an overview of the energy intensity of different water supply options, and allows for the comparison of water supply scenarios. Users can input agency- (or region-) specific water supply, energy use, and air emissions information or, alternatively, the model has default values that can be used. **For FY 92/93 through FY 05/06, the District's programs have resulted in a savings of approximately 1.45 billion kilowatt-hours (kWh) of energy (see graph), which constitutes a financial savings of approximately $183 million and is equivalent to the annual electricity requirements for 207,000 households. (See graph.)**

Through saving energy, the District's efforts resulted in the elimination of approximately 335 million kg of carbon dioxide (over the FY 92/93 through FY 05/06 time span), the equivalent of removing 72,000 passenger cars from the roads for one year (See graph). Water recycling and water conservation programs also reduced the emissions of several other air pollutants due to the energy saved: reactive organic gases, carbon monoxide, nitrogen oxides, sulfur oxides, and particulate matter smaller than 10 microns (PM10).

Energy Savings from the District's *Water Use Efficiency Programs*





Reduction of Carbon Dioxide resulting from the District's Water Use Efficiency Programs

WATER CONSERVATION

Overview

In FY 05/06, the District's Board of Directors incorporated water conservation into the District's Ends Policies. This helped clarify water conservation's role in the District's goals for short- and long-term water supply. The new Ends Policy (E-2.1.8) reads, "Water conservation is implemented to the maximum extent that is practical."

Besides meeting long-term water reliability goals, water conservation programs help meet short-term demands placed on the water supply system during critical dry periods. These programs also reduce the occurrence of demand reduction requirements made to water retailers and reduce wastewater flows to Bay Area treatment plants, protecting the Bay's salt-marsh habitat.

The water conservation program experienced another successful year, both in terms of water saved—reaching an annual total of 39,300 acre-feet in FY 05/06—and in terms of programs, research and partnerships.

Water Conservation: In The Home

The District continues to expand programs in the residential sector, as this remains one of the key areas for water conservation. The District employs a strategy of incentives and rebates, one-on-one home visits with free installations of water-saving devices, workshops, and outreach at community events to promote residential water savings. **In FY 05/06, the total annual savings attributable to all residential conservation programs reached 28,000 acre-feet.**

Water-Wise House Call Program

The District has been providing the Water-Wise House Call Program to county residents at no cost since 1998. This program is available to residents of single family homes and to owners/managers of apartments, condominiums and mobile home complexes. During the survey, technicians check for toilet flapper leaks, measure fixture flow rates, offer conservation information, and install free toilet flappers, showerheads and aerators. Surveyors also test the customer's irrigation system for uniformity, calculate and program a personalized irrigation schedule, and provide landscaping tips.

The District performed more than 1,900 residential home surveys during FY 05/06. Over 20,000 home surveys have been completed since the program began. The District continues to inspect and replace toilet flappers routinely. These inspections are important since a California Urban Water Conservation Council (CUWCC) study revealed that toilet leaks were the top reason for water waste in the home.

Low-flow Showerhead and Aerator Replacement Program

In FY 05/06, the District distributed 4,189 aerators and 2,136 low-flow showerheads. Because the saturation rate for these low-flow devices is so high, (due to plumbing codes, new construction and the District's successful distribution program), the District's WUE program is not marketing low-flow showerheads and aerators quite so aggressively at community outreach events. However, they were still installed during Water-Wise House Calls, and are still available by mail and through water retailers. These devices accounted for approximately 8,900 acre-feet per year in water savings for FY 05/06.

Above right: Water-Wise House Call technician measures irrigation efficiency during a Water Wise House Call. Above left: A water-efficient showerhead, more than two thousand of which were distributed by the District in FY 05/06.

Left: County residents who upgrade their laundry equipment to high-efficiency washers such as the one shown here can receive rebates from the District of up to $150. Below: A high-efficiency toilet for which county residents can receive a $125 rebate.

Residential Clothes Washer Rebate Program

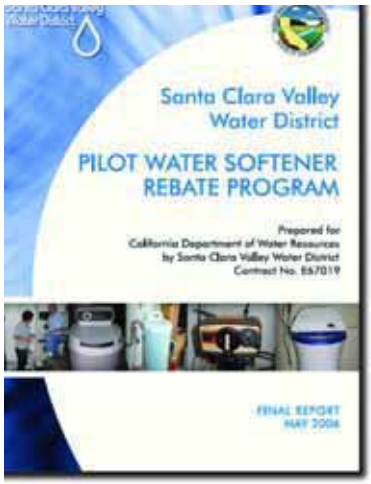
The District continued to provide countywide rebates to residential customers who replaced their old clothes washers with new, water efficient clothes washers, which use about half the water and energy of the older machines. The District has been offering the rebate program since 1995.

For FY 05/06, the rebate amounts, based on the water-efficiency rating of the clothes washer, ranged from $100 to $150. (Tiers and the clothes washers belonging to each tier are determined by a national energy efficiency association, the Consortium for Energy Efficiency, with higher tiers representing a more water-efficient clothes washer.) Clothes washers in Tiers 2 and 3a received the lower rebate amount, and clothes washers in Tier 3b received the higher rebate amount. During FY 05/06, this program awarded 9,219 rebates to residents.

During FY 05/06, the District, along with ten other Bay Area Water Agencies, was awarded a Proposition 50 grant from the Department of Water Resources for a Bay Area Regional Residential High Efficiency Clothes Washer Rebate Program. This program, which will begin in FY 06/07, will take the progressive step of rebating only the most water-efficient clothes washer tiers (Tiers 3a and 3b) in an effort to drive a market transformation towards the purchase of more water-efficient clothes washers.

Residential High-Efficiency Toilet Program

The District's High Efficiency Toilet (HET) Program provides a $125 rebate to residents when they replace their old inefficient toilet with new HETs. This new generation of toilet uses at least 20 percent less water than the federally regulated 1.6 gallon per flush (gpf) toilets. HETs include three types of technologies: a pressure assisted flush, which utilizes a flush valve similar to commercial grade toilets; dual flush toilets which have full and half-flush options; and gravity assisted flush toilets. The District issued 146 high efficiency toilet rebates in FY 05/06.



Pilot Water Softener Rebate Program

From 2001 to 2004, the District successfully implemented the Pilot Water Softener Replacement Rebate Program with partial funding from a Proposition 13 grant from the California Department of Water Resources. One of the driving forces in implementing the Pilot Program was California Senate Bill (SB) 1006 (Water Softener Bill). Enacted in November, 1999, the bill requires installed water softeners to meet the efficiency rating of at least 4,000 grains of total hardness removal per pound of salt utilized.

The Pilot Water Softener Replacement Rebate Program was designed to test the effectiveness of financial rebates in promoting the replacement of timer-based, self-regenerating water softeners installed prior to November 1999 with new, demand-initiated regeneration (DIR) models. The DIR models implement ion exchange only when a hardness limit is exceeded, thereby limiting discharge of sodium-laden water to wastewater treatment plants. The program provided a rebate incentive of $150 for residents in the county who replaced their pre-1999 water softener with a new DIR water softener, or a non-regenerating water filter, or one using centralized off-site regeneration.

The program was very successful, meeting its goal of 400 residential rebates. Results from the customer feedback survey indicated 93 percent of rebate participants used fewer bags of salt per month. The program yielded water, salt, and wastewater treatment cost savings:

- Based on the participants' monthly water consumption, the total annual water savings resulting from the program is more than 1.3 million gallons.
- The average annual salt reduction as a result of the program was 240,000 pounds of salt. This salt would otherwise have been discharged to the wastewater system.
- The average savings in the wastewater treatment operating cost is estimated at $1,623 per year.

Right: A demand-initiated, regenerational water softener, for which county residents received rebates of $150. Based on monthly water consumption data, the annual water savings from this successful pilot project is estimated to be more than 1.3 million gallons.

The success and innovative approach of the water softener rebate program received great interest from local and regional parties. On July 8, 2005, the District and the Department of Water Resources jointly sponsored a workshop in which more than 60 interested participants representing 28 entities throughout California learned about salinity management issues related to water softeners on the state and local levels. In May 2006, the District completed the final report for the Department of Water Resources. An electronic copy of the final report is available from the District's website, www.valleywater.org.

Full-Scale Water Softener Replacement Rebate Program

Building on the experience and lessons learned from the pilot program, development of a full-scale Water Softener Replacement Rebate Program is underway (approximate timeline: December 2006). The program will be a regional effort among the District, San Benito County Water District, and South County Regional Wastewater Authority (SCRWA).

The District and San Benito County jointly received a $300,000 grant from the CA Department of Water Resources under Proposition 50. The District is receiving $150,000 from the grant, which will go toward 1,000 Santa Clara County rebates of $150 each for the replacement of older water softeners.

As a regional effort, SCRWA contributed $30,000 towards an additional 200 rebates earmarked specifically within SCRWA's jurisdiction in the county, Morgan Hill and Gilroy, an area that has mostly hard water, and therefore already has a prevalence of water softening devices. A water softener replacement rebate program is one solution to managing salt entering the flow to the SCRWA facility. The program launched in October 2005. The District and the cities of Morgan Hill and Gilroy continue joint efforts to educate residents in the SCRWA service area regarding salinity issues.

Water Conservation: In Landscape

On average, about half of the water used by residents in the county goes to irrigating outdoor landscape. Having focused attention for many years on indoor water use, the District has now turned its attention to landscape—the area the District sees as having the greatest potential for water savings in the residential and commercial sectors. The District's WUE program offers a variety of programs, from irrigation evaluations and rebates for water-efficient irrigation equipment to classes and workshops, to help businesses and homeowners become as efficient as possible.

Weather Based Irrigation Controller (WBIC) Installation Program
The District's Weather Based Irrigation Controller (WBIC) Installation Program employs a new generation of irrigation controllers in managing landscape water use. These controllers (also called "smart controllers") utilize data on temperature, relative humidity, wind speed and solar radiation to calculate site specific irrigation schedules. The controllers modify their irrigation schedules daily to remain consistent with the landscape's changing irrigation requirements. The program installed 41 WBICs in FY 05/06, with a target of 657 to be installed by June 2008.

Water-Efficient Landscape Rebate Pilot Program
The District's new outdoor water conservation pilot program, the Water Efficient Landscape Rebate Program (WELRP), which began in December 2005, was designed to help customers replace high water-using landscapes, such as unused or unwanted irrigated turf grass, with District-approved low water use plants and/or permeable hardscape. A five year study in Las Vegas, Nevada found that homes that converted turf to xeriscape enjoyed a 33 percent reduction in average monthly water use.

Based on water savings potential, this program provides a rebate of $0.75 per square foot for replacing irrigated turf grass. Single family residential customers can receive a maximum rebate of $1,000 and large multi-family residential, commercial, industrial, and

Below: WUE staff examine a broken sprinkler head, which contributes to inefficiencies in landscape irrigation.

institutional customers can receive a maximum rebate of $10,000. The City of Morgan Hill shared the costs of this program with the District and increased the rebate for residents in Morgan Hill by an additional $0.75 per square foot to $1.50 per square foot. They also increased the maximum amount of the rebate to $2,000 for single family residential customers and $20,000 for large multi-family residential, commercial, industrial, and institutional customers. The District issued 14 WELRP rebates, and had 68 more applications in progress, in FY 05/06.

Landscape and Agricultural Area Measurement and Water Use Budgets Study (LAMS)

Phase 1

In 2002, the District used multi-spectral images to identify landscape and agricultural areas by parcel for over 900 square miles in Santa Clara County. These images were then used to categorize types of surfaces (such as areas of turf grass, trees, landscaping, water features, bare ground, hardscape, etc.) for each parcel. This information was used to calculate an optimal water budget for sites around the county.

Phase 2

Concurrently, the District developed web-based software that allows county water users to receive a site-specific water budget on-line by entering their contact information, meter readings, and other data. (The landscaped areas used to calculate the budget are provided by LAMS Phase I.) This countywide water budget database allows on-line users to compare their actual water usage with recommended amounts for their specific area.

Multi-spectral images were used to develop "classification layers" which identify different types of groundcover.

To provide even greater benefits from the study, the District recently decided to expand the project by creating a statewide, web-based resource. In partnership with Cal-Poly's Irrigation Training and Research Center, the District will develop software to make possible water budgeting and irrigation scheduling through-out the state. On-line users will be given a schedule—the optimum days and minutes of watering time per week—for their specific landscapes, as well as irrigation guidelines and other vital information. The project is scheduled for completion by December 2006.

Irrigation Systems Hardware Rebate Program

This program aims at difficult-to-attain but cost-effective water conservation on sites with one acre or more of irrigated landscape. After participating in the District's Irrigation Technical Assistance Program (ITAP), commercial and residential large landscapes (one acre or more) are eligible to receive a rebate of up to 50 percent (up to $4,500) on the cost of ITAP-identified irrigation system upgrades. This program launched in December 2005 and will continue into FY 06/07.

Irrigation Technical Assistance Program

The District has been providing technical assistance to large landscape managers since 1995 through the Irrigation Technical Assistance Program (ITAP). Technicians check the irrigation system for deficiencies, determine an optimum water use budget, and make site specific recommendations to improve water management. ITAP participants can potentially save up to 1,500 gallons per acre per day, representing a potential $1,000 per acre cost savings annually. The District provided 63 sites with ITAP services in FY 05/06. Since the program's inception, over 700 parks, golf courses, large commercial sites, and large residential developments have received ITAP evaluations.

Some of the participating sites this year include the Franklin McKinney School District in San Jose, the Palo Alto Unified School District, Gamble Gardens in Palo Alto, Integrated Device Technology, Juniper Networks, Santa Clara Marriott Hotel, and Toyon Farms Home Owners Association.

An irrigation specialist discusses water-use improvements at a commercial property.

Water Conservation: In Business

The Water Use Efficiency Unit combines education, technical assistance and financial incentives to encourage reduced water consumption among commercial, industrial and institutional water users. Such conservation programs help businesses save on water, energy and sewage costs, and they reduce wastewater flows to Bay Area treatment plants, thereby protecting the bay's salt marsh habitats. **Annual water savings attributable to business conservation programs reached 10,300 acre-feet in FY 05/06.**

Water Efficient Technologies Program

The Water Efficient Technologies (WET) Program provides rebates for process, technology, and equipment retrofits that save water. The rebate rate is $4.00 per hundred cubic feet (ccf) of water saved annually with a minimum annual water savings requirement of 100 ccf.

In FY 05/06, the District issued $43,000 in WET rebates and saved more than 300 million gallons of water due to this year's projects as well as to previous year's projects (projects are assumed to have a minimum of a five-year lifespan). Since 1997, the District and the City of San Jose have entered into a cost-sharing agreement to jointly fund this program. Additionally, in 2001 the District expanded this program county-wide. To date, the District has funded (either entirely or through cost-sharing with the City of San Jose) $777,163 for 69 projects saving approximately 2,351,437 ccf over the lifetime of the projects (which are assumed to have a five-year lifespan).

One highlight of this year's program was a project at Streamline Circuits in Santa Clara for the installation of an ion exchange system to reuse process water in its circuit board facilities. The project saves 18,732 gallons of water per day (9,141 hundred cubic feet per year) and was awarded a rebate of $18,281 (reflects 50 percent cost-sharing by the District with the City of San Jose). Another highlight of this year's program was a project done for Linear Technology in Milpitas for a water treatment system to reuse water from fabrication facilities for its cooling towers. The project saves 3,200 gallons per day (1,600 hundred cubic feet per year) and was awarded a rebate of $3,219 (reflects 50 percent cost-sharing by the District with the City of San José).

Right: A WUE Unit intern inspects a high-efficiency washer. Far right: The District's consultant on a water survey.

Commercial High-Efficiency Toilet (HET) Installation Program

In 2003, the District received grant funding from the California Department of Water Resources (DWR) to perform "innovative high-efficiency commercial plumbing retrofits," including conducting a direct installation program for commercial high-efficiency toilets (HETs) within the SCVWD service area.

The high-efficiency toilets installed through this program, whose pressure assisted flushing mechanisms use only 1.0 gallon per flush, save about 35 percent more water than conventional Ultra-Low Flush Toilets (ULFTs), which use 1.6 gallons per flush. To increase the savings still further, the HETs are marketed primarily to commercial sites with high savings potential, such as restaurants.

In FY 05/06, nearly 1,200 HETs were installed in approximately 100 different locations, which is an increase of about 300 HETs from FY 04/05.

Commercial Clothes Washer Rebate Program

The Commercial Clothes Washer Rebate Program provides laundromats and apartment complexes in Santa Clara County a rebate of $225 to $450 for each purchased or leased commercial high-efficiency clothes washer. This year, the District rebated only the most water efficient machines (Tiers 3a & 3b). By doing this, the District hoped to influence buyers to make the more water-efficient choice. The Commercial Clothes Washer Rebate Program provided 223 rebates in FY 05/06.

Medical Equipment Rebate Program

In 2003, the District received Proposition 13 grant funding for innovative commercial, industrial and institutional water efficient equipment retrofits, which included medical equipment rebates and the high-efficiency toilet installation program. The Medical Equipment Rebate Program was developed and launched in September 2004, rebating water efficient x-ray film processors and non-water using vacuum pumps. This program, targeting hospitals, clinics and dental offices, and continued throughout FY 05/06. During this time, one hospital, Los Gatos Community Hospital, took advantage of the rebate and upgraded three of their x-ray film processors. Due to advances in technology, hospitals and clinics are now opting for digital x-ray machines. Therefore, the demand for the x-ray film processor rebates has diminished.

Far left: A look inside a high-efficiency toilet.
Left: A water-efficient x-ray film processor at Los Gatos Community Hospital.

Commercial, Industrial, Institutional (CII) Water Use Survey Program
This program for commercial, industrial and institutional establishments in Santa Clara County began in FY 04/05 and will continue into FY 06/07. It provides:

- A thorough survey of the indoor water use of CII establishments
- Suggestions for ways to become more water efficient
- Recommendations for District programs that can help fund water efficiency improvements

For FY 05/06, twelve reports were completed, for a total of 23 completed reports. Participants this fiscal year included Amex Plating, CV Therapeutics, T. Marzetti, the Palo Alto Unified School District, the Palo Alto Medical Foundation, and De Anza and Foothill colleges.

The reports recommend District programs that can help fund water efficiency programs, such as the Water Efficient Technologies Program and the Irrigation Technical Assistance Program, to expedite equipment changes and address outdoor water use. Because most of the water savings potential seems to exist in the industrial and institutional sectors, those are the sectors targeted for the remaining surveys. At the conclusion of this program, a final report detailing the water savings potential identified at these facilities will be published.

Water Conservation: In Agriculture

The District's Water Use Efficiency program conducts winter and spring growers' meetings and provides technical assistance to help growers improve irrigation practices. This is done to facilitate growers' compliance with the non-point source discharge regulations of the Regional Water Quality Control Board. District agricultural programs also support the Central Valley Project Improvement Act, an historic compromise between agricultural, urban and environmental interests concerning the allocation of water resources.

Mobile Lab Program

The District's Mobile Lab Program started in 1998 to assess the uniformity of grower's irrigation systems. The Mobile Lab program provides free pump and irrigation system evaluations to farmers and greenhouse operators. Since its inception, it has provided 325 irrigation system evaluations to 98 growers, which represents a total of 7,845 acres. Potential cumulative water savings of 6,060 acre-feet have been identified. Financial incentives for program participation are provided by discounts to the groundwater withdrawal fees.

Growers can increase the efficiency of their water use through improvements in irrigation system uniformity. These, in turn, enable them to increase the efficiency of their fertilizer use. These improvements reduce the leaching of fertilizer-derived nitrogen to the groundwater. This program has helped both in irrigation efficiency and groundwater quality.

Orchard participating in the Mobile Lab program for irrigation management.

California Irrigation Management Information System (CIMIS)
This valuable free service provides daily reference evapotranspiration estimates to growers and landscape irrigators to use for scheduling irrigation. Reference evapotranspiration is the water use of a standardized green grass crop. Crop evapotranspiration is related mathematically to reference evapotranspiration.

The District owns and maintains two CIMIS weather stations in Santa Clara County. One is active at Live Oak High School in Morgan Hill (since 1997), and one was temporarily decommissioned in November 2002 pending relocation. The weather stations measure sunlight intensity, humidity, wind speed and direction, and temperature every six seconds to estimate reference evapotranspiration.

The District's CIMIS weather stations are part of a statewide network of stations from which the California Department of Water Resources' (DWR) central computer downloads data nightly. Growers and landscape irrigators can access current irrigation scheduling information around the clock by visiting the District web site at www.valleywater.org.

The District also gathers weather data from so-called "non-ideal" sites. These are sites throughout the county (and the state) which do not meet the specifications for a standard CIMIS station. Non-ideal sites are correlated to their nearest CIMIS site, and this relationship provides a means of making non-ideal evapotranspiration data site specific. This long-range project will give landscape managers in local microclimates more accurate data for their irrigation decisions.

Water Conservation:

EDUCATION & OUTREACH

The key to any program's success is a good education and outreach component. To this end, the District has worked hard to develop effective and informative classes and materials.

Water Use Efficiency Nursery Program

For the last eight years, the District has distributed water conservation information through display racks located at county nursery and garden stores. These display racks contain literature discussing water-wise gardening, efficient lawn watering, drought resistant plants, drip irrigation and District programs. In FY 05/06, 20 nurseries participated in the program throughout the county.

Water-Efficient Landscaping Workshops for Homeowners

The District held its 14th annual Water Efficient Landscaping Workshop series in March 2006 over four weekends. The topics were: Selecting Plants for your Water-Wise Garden, Water Efficient Irrigation Design, Water-Wise Garden Design, and Gardening with Natives. The workshops are presented by landscape and irrigation experts each spring to provide practical advice on water-saving gardening. A total of 145 people attended this series of workshops.

Community Events

The District promoted water use efficiency at numerous community events in FY 05/06, including a gardening workshop in the Mayfair community, Water Conservation Day at the San Jose Giants, irrigation seminars for landscape professionals, landscaping workshops for homeowners, and many others. These events give the District's WUE program an opportunity to talk to the public directly, and to educate them about water use efficiency with hands-on displays, educational handouts and free, water-efficient device distribution.

Right from top to bottom: Kurt Elvert spreading the word on water conservation awareness at a San Jose Giants game; plants at one of the nurseries participating in the District's Nursery Program; participants at a seminar for water-wise gardening with native plants.

Water Awareness Campaign

Each year, the District develops a Summer Water Awareness Campaign. The campaign consisted of television, transit, radio and print advertising, started in May and lasted through the summer. It's main goal was to increase community acceptance of the importance of conserving water—even when we're not in a drought—and to encourage community members to adopt water-efficient behaviors and implement water-saving technologies to help ensure that future water supplies are adequate.

Going Native Garden Tour

The District co-sponsored 4th Annual Going Native Garden Tour 2006 took place on Sunday, April 30th. The tour was a great success, showcasing 46 native plant gardens throughout Santa Clara and San Mateo counties, with a recorded 7,600 visitors. The District has sponsored this event since its inaugural year. This year, in addition to being one of the event sponsors, the District was also a featured garden on the tour. In an effort to increase public awareness of native and low-water-using plants, District staff created signage for 96 California plants located around the Almaden campus. These signs provide information regarding each plant's water and sunlight requirements, attractiveness to deer, California native plant status and a brief plant description.

The Going Native Garden Tour is the Bay Area's first native garden tour. This community-based event is free of charge to the public. Each tour features home and public gardens in a self-guided tour format. Its goals are to demonstrate reduced water, chemical and pesticide use, improved habitat and the unique aesthetic appeal of gardens designed with California native plants.

Left, top to bottom: California poppies are among the most popular and prolific native plants and appear frequently in water-wise gardens; participants at one of the District's many community outreach seminars; residents admire the native plants at the District for the Going Native Garden Tour; A WUE Unit intern talks with visitors to the Home and Garden Show about water-efficient landscaping.

Seminars for Agriculture Professionals
Since 1998, the District has presented two workshops annually for growers—one in April and one in December—on topics relating to water and fertilizer use efficiency, District programs, farm safety and legal compliance. All workshops have been presented with simultaneous Spanish translation.

Annual Winter Growers Meetings
The District co-sponsored an Annual Winter Growers Meeting in December 2005, which covered topics such as irrigation scheduling with CIMIS and tensiometers, and preventing run off and groundwater contamination.

Annual Fertigation Workshops for Irrigators
The 2006 Annual Fertigation Workshop was held on July 12 in Hollister. The workshop included a simultaneous Spanish translator.

Landscape Irrigation Workshops for Professionals
The District conducts a special one-day water conservation workshop each year for landscape contractors. Topics change annually as irrigation issues are identified in the field. In FY 05/06, the workshop covered basic hydraulics of an irrigation system, how to increase distribution uniformity, and common mechanical and electrical problems. The District offers the contractor workshops in both English and Spanish.

An instructor explains the distribution of fertilizer through the irrigation system with time.

Water Conservation:

2005

JULY

8	**A Salinity Management Strategy, Water Softener Rebate Program Workshop** Co-sponsored by Department of Water Resources, San Jose
10	**Summer Water Conservation Campaign Education Table** Orchard Supply Hardware (OSH), promoted by OSH & KBAY Radio, San Jose
23	**Summer Water Conservation Campaign Education Table** Orchard Supply Hardware (OSH), promoted by OSH & KBAY Radio, Sunnyvale

AUGUST

6	**Summer Water Conservation Campaign Education Table** Orchard Supply Hardware (OSH), promoted by OSH & KBAY Radio, San Jose
20	**District Water Conservation Day** San Jose Giants, San Jose
21	**Summer Water Conservation Campaign Education Table** Orchard Supply Hardware (OSH), promoted by OSH & KBAY Radio, San Jose
27	**Water-Wise Gardening Workshop for Mayfair Community Gardeners** Mayfair Community Garden, San Jose

SEPTEMBER

10	**Guadalupe River Park Grand Opening** Columbus River Park at Guadalupe Gardens, San Jose
9-11	**24th Annual South Bay Home and Garden Show** Santa Clara Convention Center, Santa Clara
27	**Fertigation Class, hands-on field instruction for irrigators and growers** In cooperation with UC Cooperative Extension, Salinas
28	**Stewardship for Small Acreage Vineyard Tour** and talk about Vineyard Irrigation, Gilroy

DECEMBER

13	**Annual Winter Growers Seminar** Co-sponsored by the Santa Clara County Dept. of Agriculture, San Martin
13-15	**Irrigation and Water Budgeting Training Session** Co-sponsored by Irrigation Training and Research Center, Cal Poly
16	**Bay Area Chrysanthemum Growers Association Continuing Education Meeting** In cooperation with UC Cooperative Extension and the Santa Clara County Department of Agriculture, San Jose
17	**Drought Tolerant Plants, Information Table and Display** Common Ground Garden Supply and Education Center, Palo Alto

2006

JANUARY

27	**Ecological Farming Conference** Asilomar Conference Center, Asilomar

FEBRUARY

16	**San Mateo/Santa Cruz Growers Meeting** In cooperation with Pajaro Valley Management Agency and UC Cooperative Extension, Watsonville

Calendar of Events

MARCH

4 — **Water-Wise Garden Design**
Santa Clara Valley Water District, San Jose

4 — **Green Building Fair**
Santa Teresa Hills Presbyterian Church, San Jose

11 — **Selecting Plants for your Water-Wise Garden**
Santa Clara Valley Water District, San Jose

14 — **San Benito and Santa Clara Counties Spring Growers Meeting**
In cooperation with San Benito County Water District and UC Cooperative Extension, Hollister

18 — **Gardening with Natives**
Santa Clara Valley Water District, San Jose

25 — **Water Efficient Irrigation Design**
Santa Clara Valley Water District, San Jose

28 — **VEP Community Association Home Faire**
Gunderson High School, San Jose

APRIL

1 — **Master Gardeners' 12th Annual Spring Garden Market**
San Jose Mercury News, San Jose

18 — **Earth Day at Intel**
Intel Headquarters, Santa Clara

22 — **Palo Alto Greenlight Earth Day Film Festival**
Gunn High School, Palo Alto

29 — **City of Gilroy Earth Day Event**
Christmas Hill Park, Gilroy

30 — **Fourth Annual Going Native Garden Tour**
Various home gardens landscaped with California native plants located all over Santa Clara County, including the Santa Clara Valley Water District

MAY

3 — **Stewardship for Small Acreage Vineyards**
Presented for Loma Prieta Resource Conservation District, Gilroy

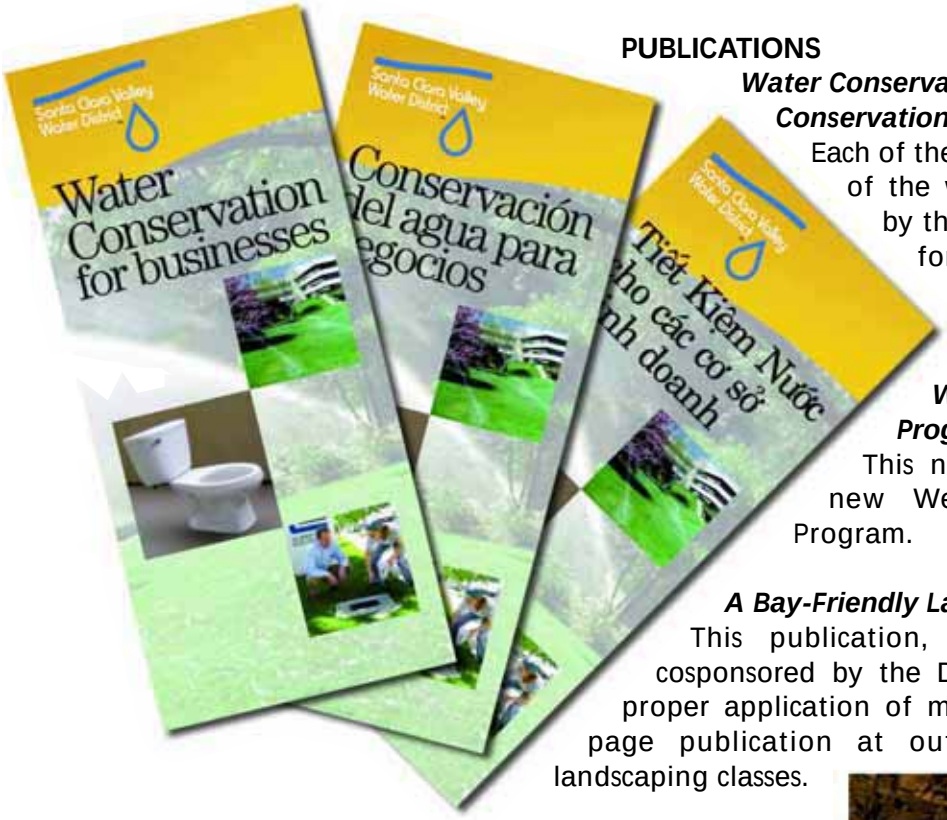
13-14 — **Housing Fair Event**
San Jose Flea Market, San Jose

31 — **Presentation on the Mobile Lab Program**
Presented at the Farm Water Quality Planning Class Tour, for the UC Cooperative Extension and Farm Bureau at Morgan Hill

JUNE

3 — **ECHO (Executive Council of Homeowners) Annual Seminar and Trade Show**, Santa Clara

6-7 — **Fertigation Class, hands-on field instruction for irrigators and growers**
In cooperation with Agriculture and Land Based Training and the UC Cooperative Extension, Salinas



PUBLICATIONS

Water Conservation for Residents and Water Conservation for Businesses

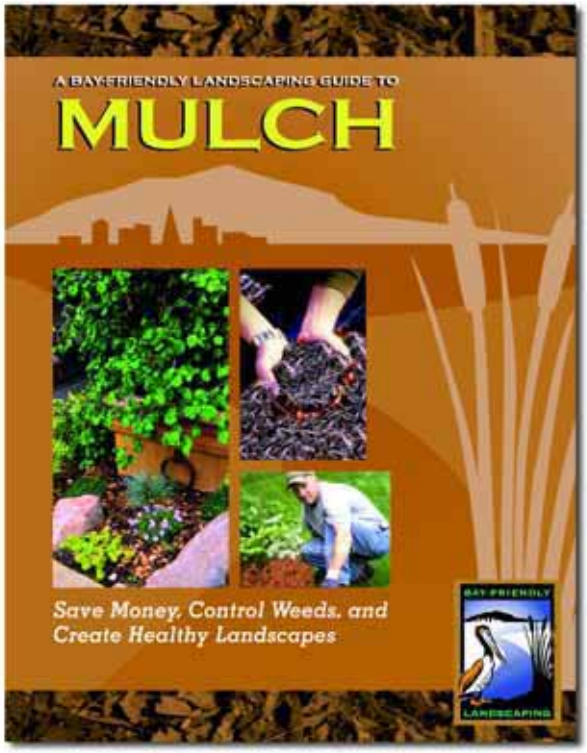
Each of these new brochures provides a summary of the water conservation programs offered by the District; one for residents, the other for businesses. They are available in Spanish and Vietnamese as well as English.

Weather-Based Irrigation Controller Program Brochure

This new brochure describes the District's new Weather-Based Irrigation Controller Program.

A Bay-Friendly Landscaping Guide to Mulch

This publication, produced by StopWaste.org and cosponsored by the District, describes the important and proper application of mulch. The District distributes this 15 page publication at outreach events and in water-wise landscaping classes.



Handbook for Agricultural Water Use Efficiency

This handbook describes how to integrate the tools available to Santa Clara County growers into operations to maximize their water and fertilizer use efficiency.

Water Conservation:

Cost-Sharing Agreements, Partnerships & Grants

Water use efficiency is a community-wide effort, and it will take the cooperation of many agencies, organizations and water retailers to meet future water supply goals. The District maintains cost-sharing agreements with many area cities and utilities to provide water-use efficiency programs for residential and commercial water customers.

The District's WUE program administered over $673,000 in cost-sharing agreements in FY 05/06. Cost-sharing agreements that were active in FY 05/06 included:

- **City of Palo Alto**:
  Cost-sharing agreement for a variety of water conservation programs: $96,405
- **City of Santa Clara:**
  Cost-sharing agreement for commercial high-efficiency clothes washer rebates: $12,500
- **City of San José**:
  Cost-sharing agreement for a variety of water conservation programs: $460,000
- **California Water Service Company**:
  Cost-sharing agreement for a variety of water conservation programs: $25,000
- **City of Morgan Hill**:
  Cost-sharing agreement for the Water-Efficient Landscape Retrofit Program: $50,000
- **South County Recycled Water Authority**:
  Cost-sharing agreement for the Water Softener Rebate Program: $30,000

Technician installs High-Efficiency Toilet in restaurant.

The District also relies on grants from state and federal agencies to help fund program expansion and vital research.The District's WUE program participated in many different on-going grant projects this year, including:

- **Weather-Based Irrigation Controller Program**:
  This regional DWR Proposition 13 grant for funding weather-based irrigation controller retrofits began in FY 05/06.
- **Residential Clothes Washer Rebate Program**:
  A regional DWR Proposition 13 grant-funded program began in FY 04/05 and continued into FY 05/06.
- **Irrigation System Hardware Rebate Program**:
  This DWR Proposition 13 grant-funded program began in FY 05/06.
- **Commercial Clothes Washers Rebate Program**:
  The California Public Utilities Commission funded this regional grant program, administered by Energy Solutions, to help fund high-efficiency clothes washer rebates. Funding concluded in December of 2005.
- **Innovative High-Efficiency Commercial Equipment Retrofit Program**:
  This program, funded by a DWR Proposition 13 grant, was designated to help fund financial incentives to replace commercial equipment with water-efficient models. This program commenced in FY 04/05 and continued through FY 05/06.
- **Demonstration Garden**:
  The District's WUE program applied for and was awarded $146,000 in grant funding through a DWR Proposition 50 grant.

Adjusting the controller of a residential water-efficient landscape irrigation system.

Water Conservation:

Studies & Research

The District is continually conducting research, on its own and in collaboration with other agencies, to increase water savings and cost-effectiveness in its water-conservation programs. Data from the studies and research listed below will be vital in creating an effective, long-range water-management strategy for Santa Clara County.

The District is striving to gain reliable information on how conservation programs work most efficiently. Ongoing research helps us evaluate the cost-effectiveness of our programs, as well as test new programs and water-saving devices as they become available.

How do the attitudes and practices of residential, business, and agricultural customers affect their water use? Which programs and users have the greatest water savings potential? How can we use the latest technology to give customers the water conservation tools they need? These are just a few of the important issues being explored in the following studies.

District's WUE program Strategic Plan

Water conservation, recycling, and desalination are an integral part of the current and future water supply source for the future. The Water Use Efficiency Strategic Plan will establish a road map for the Water Use Efficiency Unit. It will recommend a comprehensive set of programs in the areas of water conservation, recycling, and desalination, along with cost-benefit analyses and savings potential. The Plan will also help the District's WUE program fulfill its commitment to the CEO Comprehensive Plan with regard to water conservation and recycling, and is expected to be completed in FY 06/07.

Artificial Turf Feasibility Study

Artificial turf has the potential to save substantial quantities of water, and as such, has received considerable attention from the water conservation community. Before the District decides whether to offer financial incentives for the installation of artificial turf in the business and residential communities, the District plans to determine whether there are any adverse water quality impacts to groundwater or surface water due to artificial turf installation. A preliminary study done by the District suggests that heavy metal contamination (specifically zinc, copper, barium and chromium) may be a concern.

In FY 06/07 Phase II of the Artificial Turf Feasibility Study will investigate water quality at field sites around the county where artificial turf has been installed.

Water Conservation:

FUTURE PROJECTS

Residential Irrigation System Hardware Retrofit Program

By building on the customer information accrued through the Water Wise House Call Program over the last three years, the Residential Irrigation System Hardware Retrofit Program (funded by a $235,000 Water Use Efficiency grant from the U.S. Bureau of Reclamation) targets the installation of water-efficient irrigation hardware on residential sites previously identified as having high, unrealized conservation potential. By building on the customer information accrued through the Water Wise House Call program in the last three years, this program aims at difficult-to-attain but cost-effective landscape conservation. These hardware installations can be expected to produce water savings lasting longer than the savings that can be attained through behavioral change alone. This project is expected to begin in FY 06/07.

Cooling Tower Conductivity Controller Rebate Pilot Program

District research and analyses indicate that significant water-use efficiency improvements can be achieved by improving the water efficiency of the cooling towers used to regulate air temperature in commercial facilities. Cooling towers use substantial quantities of water, and approximately 75 percent of them do not use water efficiently. Cooling tower conductivity controllers and cooling tower pH controllers both produce more efficient water use.

This program will help increase water use efficiency by providing rebates to CII customers for the installation of cooling tower conductivity controllers and pH controllers. The amount of the rebate likely will be based on the size of the cooling tower. This program, which will be done through a grant from the CUWCC, is expected to begin in FY 06/07.

Demonstration Garden

The water use efficiency demonstration garden will be an educational resource, test facility and learning center providing environmentally sound and cost effective landscaping alternatives. The overall goal of this project is to design and develop a unique demonstration landscaping site that promotes water-use efficiency. Its primary purpose is to educate the general public on the use of water-wise plants while promoting efficient irrigation technologies and recycled water use.

A conceptual design for the demonstration garden has been completed. To offset some of the construction costs, the Water Use Efficiency Unit applied for and was awarded $146,000 in grant funding through Proposition 50 (the District will be responsible for approximately $48,000 of "in kind" costs which are primarily annual maintenance costs). The District is also working with the City of San José Parks and Recreation Department, the Guadalupe Gardens Technical Committee, and the Friends of Guadalupe Park and Gardens to assist in the implementation of the project.

Top: The demonstration garden will focus on landscape design that promotes water-use efficiency through the use of water-wise plants such as the ones shown here; Bottom: Detail from the conceptual design for the District's future demonstration garden.

WATER RECYCLING & DESALINATION

Overview

To ensure that the mission of the District is realized, the Board of Directors has established organizational outcomes, or Ends Policies, to be achieved by the CEO and staff. Ends Policies describe the specific outcomes to be achieved, starting with general statements followed by specific descriptions.

The District's 2003 update to the Integrated Water Resources Planning Study and the 2005 Urban Water Management Plan identified water recycling and desalination, along with water conservation, as key components in meeting future dry year shortfalls. Recycled water and desalination are all-weather resources. Increasing recycled water supplies in Santa Clara County would increase overall water supply reliability, augmenting the District's imported water supply. The 2005 Urban Water Management Plan's projection for recycled water in the year 2010 is almost 17,000 acre-feet. This represents a shortfall of approximately 2,500 acre-feet from the Board's 5 percent target for 2010. Similarly, the 2020 projection estimates that, at the current levels of effort, recycled water expansion in 2020 will only be 25,000 acre-feet, which is an almost 15,000 acre-feet shortfall from the Board's 10 percent target of 40,000 acre-feet. Recycled water use is being expanded in accordance with another Board Policy that calls for groundwater quality to be aggressively protected from contamination or threat of contamination. However, if recycled water use is to reach Board targets, a significant investment in recycled water expansion projects will need to be made.

The 2003 IWRP has the following recommendations for water recycling and desalination:

- Encourage investments in New Local Water Sources—the District should continue to explore local options, such as expanded conservation, groundwater recharge, water recycling, desalination and local storage to promote a greater variety of water sources.
- Resolve quality and market issues related to recycled water and evaluate potential use in the future.
- Conduct further study of advanced treatment of recycled water.
- Engage the public to avoid hurdles in recycled water perception and acceptance.
- Seek funding for advanced treatment projects and other recycled water projects.
- Explore the feasibility of desalination through studies to confirm potential quantities, public acceptance and costs. The 2003 IWRP recommends feasibility study work on both brackish desalination and seawater/bay desalination.

Taking these steps now will prove valuable if the District contemplates expanding recycled water over unconfined areas as well as potential indirect potable reuse in the future.

The 2005 Urban Water Management Plan specifically states that, "*the difference shown between recycled water projection and the District target in 2010 and 2020 will potentially be achieved by additional investments in recycled water projects including advanced treatment of recycled water, groundwater recharge and streamflow augmentation.*"

In FY 05/06, all projects and programs were conducted in accordance with District Board policies as well as with 2003 IWRP recommendations and 2005 Urban Water Management Plan.

A WUE Unit intern collects a water sample.

Recycled water use is especially important for irrigation and industrial uses because it makes potable, surface and groundwater available for drinking purposes. Using recycled water also protects the bay's salt marsh habitat by reducing freshwater effluent released from wastewater treatment facilities into the San Francisco Bay. By laying the groundwork now for new programs and studying recycled water uses and issues, the District will be ready to create more partnerships and systematically expand countywide water recycling.

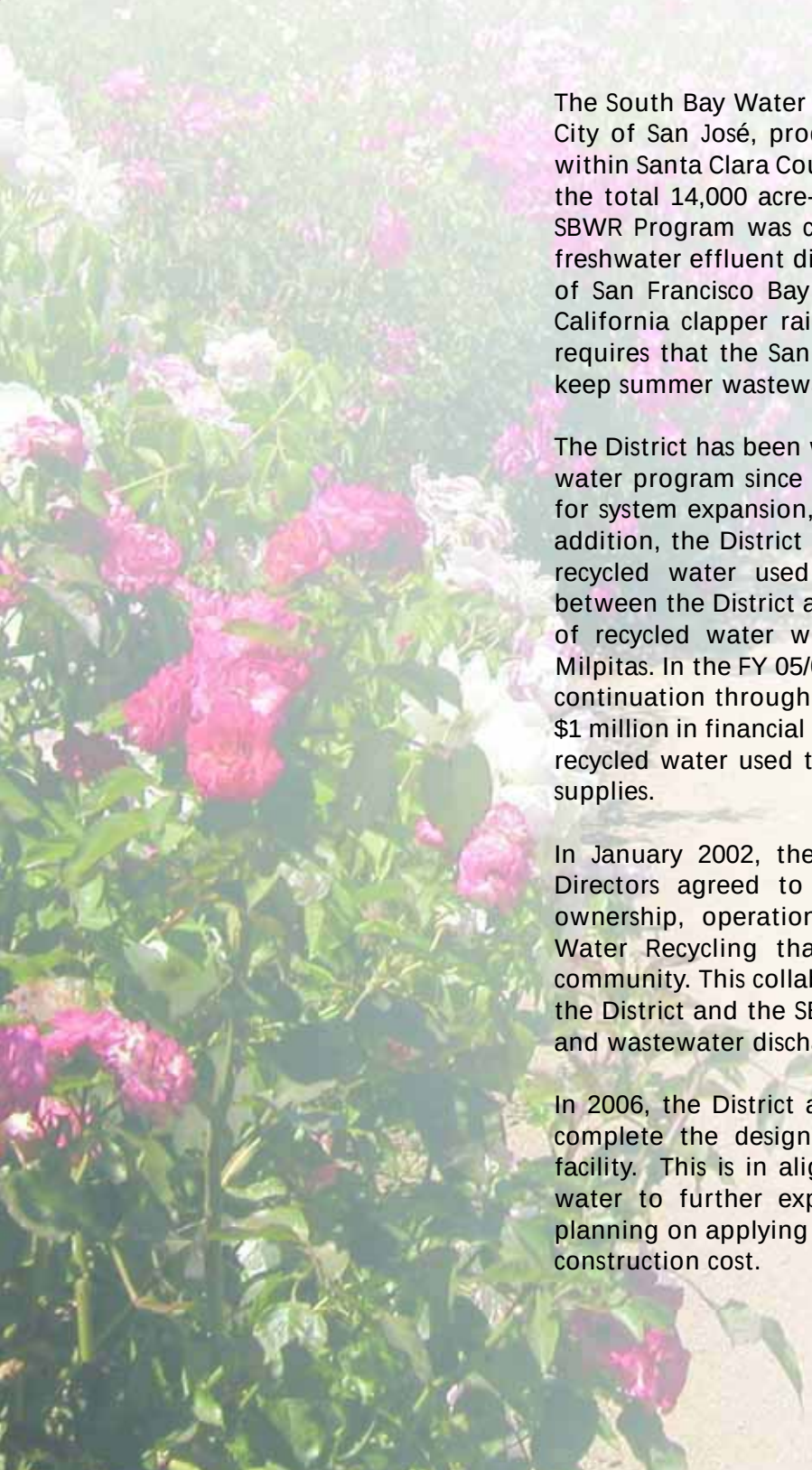
Advanced treated recycled water is being studied intensively to assess its suitability for protecting current baseline uses, future groundwater recharge and future potential stream flow augmentation to enhance the District's conjunctive water management.

The District's approach to recycled water expansion is to develop partnerships with the cities and publicly owned agencies that produce and/or distribute recycled water. The District has entered into recycling partnerships with all four recycled water producers in Santa Clara County: the South Bay Water Recycling Program (SBWR) operating out of the San José/Santa Clara Water Pollution Control Plant, the Sunnyvale Water Pollution Control Plant (Sunnyvale WPCP) and the South County Regional Wastewater Authority (SCRWA) in Gilroy. In FY 04/05, the District began studies of plant and soil limitations to recycled water quality and the site-specific, best-management practices for use of recycled water for the City of Mountain View and the Palo Alto Regional Water Quality Control Plant (Palo Alto RWQCP).

The District sees desalination as a viable way to diversify its water supply portfolio and increase supply reliability. The 2003 Integrated Water Resources Planning Study identified two preliminary objectives for desalination: augmentation of the District's current water resources, and creation of greater drought or emergency reliability by serving as a consistent, supplemental water supply source.

Water Recycling:

South Bay Water Recycling Program



The South Bay Water Recycling (SBWR) Program, administered by the City of San José, produces the majority of recycled water delivered within Santa Clara County. In FY 05/06, the program produced 8,000 of the total 14,000 acre-feet of recycled water used in the county. The SBWR Program was created to reduce the environmental impact of freshwater effluent discharged into the salt marshes of the south end of San Francisco Bay to help protect two endangered species: the California clapper rail and the salt marsh harvest mouse. The state requires that the San José/Santa Clara Water Pollution Control Plant keep summer wastewater flows below 120 million gallons per day.

The District has been working with the City of San José on its recycled water program since 1994, providing financial and technical support for system expansion, and acting as a liaison with water retailers. In addition, the District has provided financial incentives since 1995 for recycled water used to displace potable water. The partnership between the District and the City of San José provides for distribution of recycled water within the cities of San José, Santa Clara and Milpitas. In the FY 05/06 time frame, this agreement was amended for continuation through June 30, 2007. The District has provided almost $1 million in financial incentives to the City of San José for the FY 05/06 recycled water used to offset the demand for District potable water supplies.

In January 2002, the San José City Council and District Board of Directors agreed to develop an institutional framework for the ownership, operation, maintenance and expansion of South Bay Water Recycling that most effectively meets the needs of the community. This collaborative effort defines the relationship between the District and the SBWR Program, and helps meet the water supply and wastewater discharge needs of the South Bay community.

In 2006, the District and the City of San Jose will work together to complete the design requirements for a five-mgd recycled water facility. This is in alignment with improving the quality of recycled water to further expand its uses. The project sponsors are also planning on applying for state and federal grants to offset the future construction cost.

The City of San Jose's new City Hall uses recycled water for irrigation, water features and toilet flushing.

Facilities and Customers

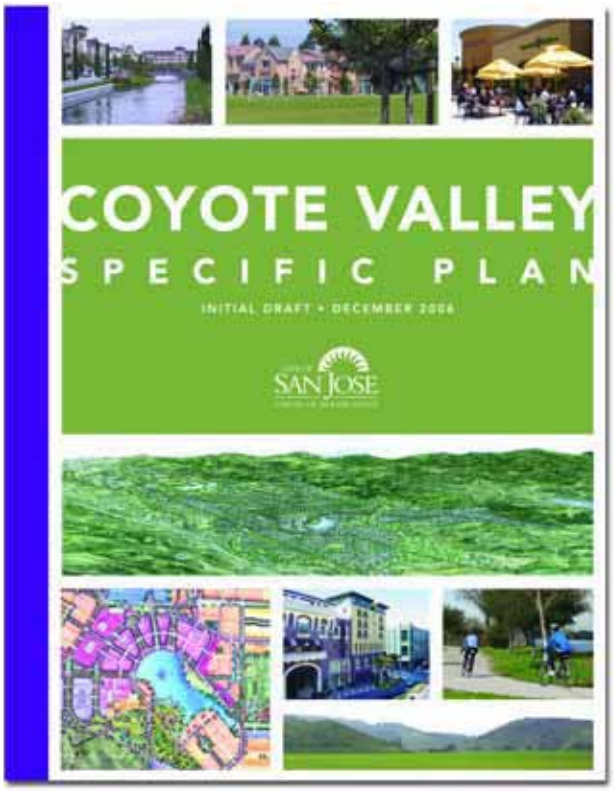
The combined costs of Phases 1 and 2 of the SBWR Program was $220 million, which funded pipeline expansion and included the construction of one hundred miles of pipeline. The system is capable of delivering 21 million gallons per day (mgd), and so far has delivered above 11 mgd on hot summer days. It serves more than 500 customers, mainly for landscape irrigation at parks, schools and golf courses.

Industrial users were slow initially to accept recycled water, but their number has increased over the years. With the recent additions of Los Esteros Critical Energy Facility, the Donald Von Raesfeld Power Plant (also called Pico Power Plant), and Metcalf Energy Center (MEC), industrial use comprised an increasing share of SBWR's demand. Industrial uses of recycled water include water processing for manufacturing and for cooling towers. Dual plumbing for non-potable restroom uses is also increasing, especially in commercial high-rise developments. Several commercial complexes including Nortel, Yahoo! and Cisco are dual-plumbed for toilet flushing. Recently, the new San José City Hall and the Martin Luther King Jr. Library were also dual plumbed for use of recycled water.

Silver Creek Pipeline/Coyote Valley Specific Plan

The District entered into an agreement with the SBWR Program and invested approximately $5.5 million, or 25 percent of total construction costs, in seven miles of the 30-inch Silver Creek Pipeline. The pipeline delivers approximately 3,000 acre-feet per year of recycled water to the new MEC, which began operation in June 2005. As part of the agreement with the SBWR Program, the District maintains the sole right to use a capacity of 5 mgd and any unused capacity of the total 15 mgd, and becomes the recycled water wholesaler to the Santa Teresa area and Coyote Valley.

The Coyote Valley Specific Plan Development is a "new town" envisioned to create 50,000 jobs and 25,000 housing units in North and Mid-Coyote Valley and establish a permanent greenbelt in South Coyote Valley. The Silver Creek Pipeline Agreement with the SBWR Program will become the foundation of a recycled water supply to the Coyote Valley project.



The District's Water Supply Availability Analysis projects the Coyote Valley development's water demand to be 16,000 to 20,000 acre-feet per year, and identifies recycled water as the key component for sustainable development because of its drought-proof nature. Finally, advanced treated recycled water can be used for non-potable irrigation uses to offset demand on the Coyote Subbasin, which has a limited storage capacity. The estimated recycled water demand for nonpotable uses is 4,000 acre-feet per year.

The analysis also suggests that advanced treated recycled water could provide source water for supplementing the groundwater subbasin. It has been agreed between the City of San José, the District and other stakeholders in the South Bay Water Recycling Collaborative process that recycled water should be advanced treated in order to ensure the maintenance of groundwater quality in the sensitive Coyote Subbasin. If the District's and City of San José's joint application for State grant funds is successful, a 5 mgd advanced recycled water treatment facility in the next few years may be erected. The District began the consultant selection process for design and construction drawings for this facility, in order to align with the potential grant timeline requirements.

Reimbursement Agreement/Distribution Cost

The District continues to provide financial assistance to recycled water purveyors of $115 per acre-foot of recycled water, because recycled water supplements the county water supply and strengthens the reliability and diversity of the District's water portfolio. The District and City have executed a two-year extension to their financial incentive agreement. This will expire by June 30, 2007. The District and City of San José have on-going monthly (and sometimes more often) meetings to review other forms of partnership, including cost-sharing of a future advanced treated recycled water facility.

Above left: Recycled water reservoir construction by South Bay Water Recycling Program. Right: Golf Course irrigated with recycled water from South Bay Water Recycling Program.

The District has been exploring more active partnership roles with SBWR. An alternative could be cost sharing on expansion projects. As with the Silver Creek Pipeline arrangement, the District could contribute to a construction project in exchange for exclusive system capacity. This capacity would allow the District to be the wholesaler in new service areas. The District and City staff frequently discuss new partnership opportunities and joint projects that will improve water quality and the use of recycled water. The District has expanded efforts in FY 05/06 to seek federal funding for an advanced treatment plant.

Why is it opportune to consider recycled water use in upcoming future developments, including Coyote Valley and North San José?

Early large-scale development in an area, including the planning of a new town, provides a unique opportunity to cost-effectively develop the infrastructure for recycled water delivery. While recycled water is being deployed throughout the county, its pace of deployment can be economically accelerated in new development. New water supply demands throughout the county may require recycled water components. The North San José development and Coyote Valley exemplify this.

The City of San José's envisions a minimum of 25,000 households, 50,000 jobs and 80,000 people for the Coyote Valley development. The City of San José also has new development plans for the area in North San José. The District's goal is to work collaboratively with the City and other stakeholders to realize a shared vision for a sustainable and environmentally sensitive development that contributes to a sustainable and enhanced quality of life for the existing and future residents of Coyote Valley, the City of San José and all of Santa Clara County.

Water Recycling:

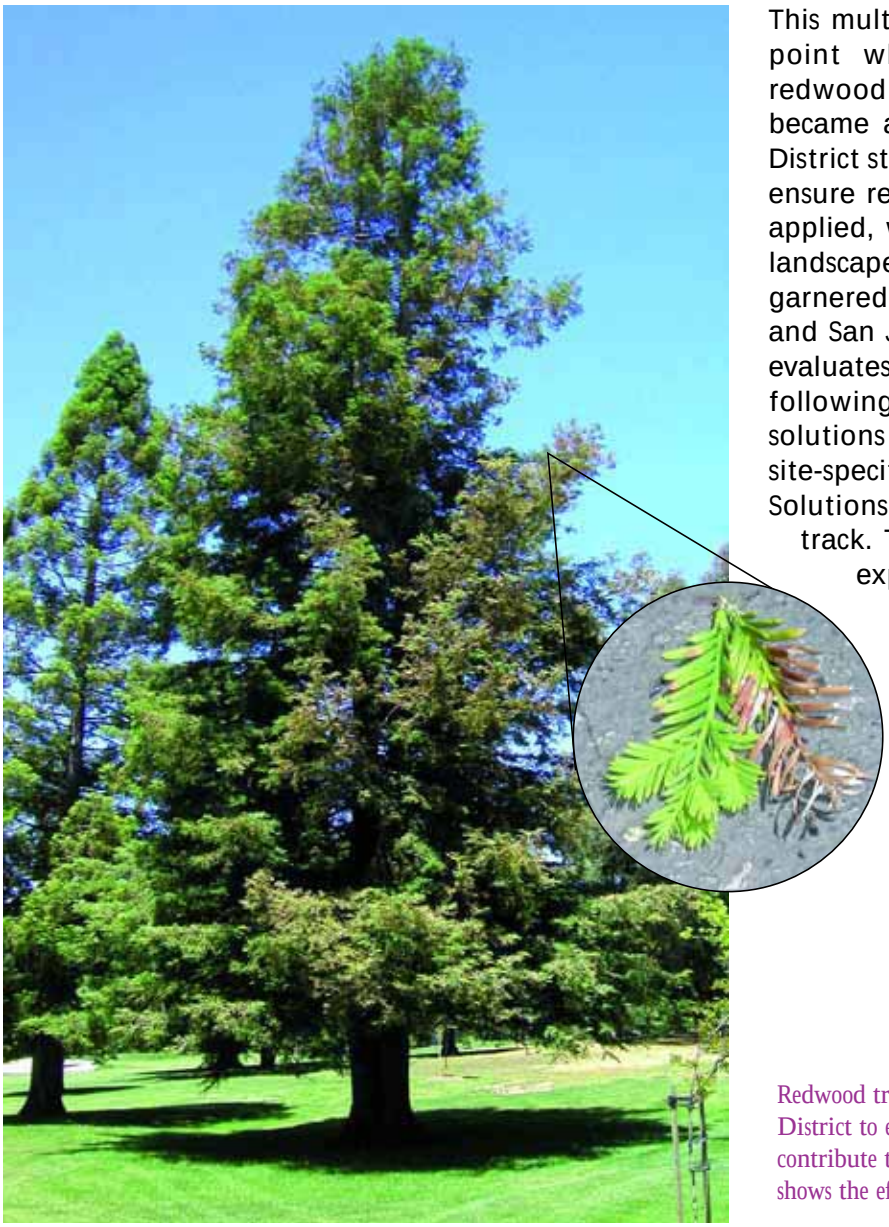
PALO ALTO

Recycled Water Expansion Plan for Palo Alto

The Palo Alto Regional Water Quality Control Plant (RWQCP) serves Palo Alto, Mountain View, Los Altos, Los Altos Hills, Stanford University and the East Palo Alto Sanitary District. In 2005, RWQCP delivered 2306 acre-feet of recycled water, which included 1,000 acre-feet of treatment plant processing use that was not recorded in previous years.

In 2005, RWQCP completed the planning phase of its Palo Alto/Mountain View Pipeline Extension with the goal of replacing the existing pipeline to the Shoreline Golf Course and extending the pipeline to the Mountain View-Moffett area. The proposed pipeline follows the levees along Matadero Creek, and will be located adjacent to East Bayshore towards Mountain View. The pipeline replacement helps fulfill RWQCP permit requirements. The RWQCP is required to operate and maintain the Water Reuse Program to mitigate the discharge of treated wastewater to San Francisco Bay.

Engineering and design of this project started in summer 2005, and construction is expected to begin in 2007. The project cost will be shared between the RWQCP and the cities of Palo Alto and Mountain View and will receive up to $4 million in State Proposition 50, Chapter 7 grants. The cost of this project is estimated at approximately $26 million. Mountain View is to fund $6 million, and the City of Palo Alto, $4 million. The project sponsors have also applied for other state and federal grants to offset this cost.



This multi-million dollar project was at risk at one point when concern about the sensitivity of redwood trees to the salinity in recycled water became a prominent issue in the South Bay. The District stepped in, offering a "Solutions Project" to ensure recycled water, properly manufactured and applied, would not contribute to redwood tree or landscape decline. This "Solutions Project" also garnered the interests of the cities of Santa Clara and San José, which joined the effort. This project evaluates water quality, soil and drainage issues following the investigation phase, and will develop solutions or best management practices based on site-specific landscape, soil and water qualities. The Solutions Project helped get the project back on track. The mayor of the City of Mountain View expressed his appreciation by sending a letter to then-District Board Chairman Joe Judge.

Redwood trees, such as the one shown here, were monitored by the District to ensure that recycled water, properly applied, would not contribute to the decline of redwood trees in the area. The inset shows the effect of saline soil on redwoods.

Water Recycling:

SUNNYVALE

Support for Sunnyvale's Recycled Water Program

The City of Sunnyvale has experienced a slight increase in recycled water consumption and a meaningful decrease in potable water consumption, primarily due to a combination of wet weather and economic downturn. The District has provided a financial incentive to the City of Sunnyvale's water recycling program since 1997 at the rate of $115 per acre-foot of recycled water used to offset potable water. The reimbursement by the District helps the City offset the deficit between revenues and expenses, and enables the City to make additional capital improvements to increase system reliability and expand system capacity. The District and City of Sunnyvale executed a two-year extension, which will expire by June 30, 2007. The District and City have on-going bi-monthly meetings to discuss other forms of partnership that will assist in the expansion of recycled water.

The Sunnyvale Water Pollution Control Plant (WPCP) plans to expand its water recycling systems in order to meet state and federal discharge requirements. Staff from the City and the District have had discussions on developing a long-term comprehensive operating strategy and on near-term recycled water expansion opportunities. Expansion could improve the reliability of the system, and provide improved hydraulic stability and greater versatility by "looping" the system. Possible expansion could include providing recycled water to Moffett Field Golf Course and a proposed new development at NASA Ames. Serving these new customers may require a collaborative effort between the District, the City of Sunnyvale, the City of Mountain View, the City of Palo Alto and the San Francisco Public Utilities Commission. This work will require significant improvements to the distribution system. The looping of the system, as well as additional storage and pumping capacity would be required to provide water in sufficient quantity and pressure to meet the demands of customers within the city limits.

Water Recycling:

South County

District Takes on Different Roles for Recycled Water

The District maintains different recycled water roles in the county. For example, in south Santa Clara County, the District is a wholesaler of recycled water. The South County Regional Wastewater Authority (SCRWA) produces recycled water and the City of Gilroy is the retailer. The District, Gilroy and SCRWA have producer-wholesaler-retailer agreements in place delineating their respective roles and responsibilities. This differs from the north part of the county, where the District is not a producer/wholesaler/retailer. The District takes on partnership roles and enters into agreements for joint pipeline construction projects, recycled water reimbursement incentives, or joint water quality studies that all lead toward the goal of expanding recycled water used in the county.

Background

In 1977, the Santa Clara Valley Water District, the City of Gilroy and the Gavilan Water Conservation District (which was merged with the District in 1989) entered into a partnership to construct and operate a recycled water system extending from the SCRWA treatment plant southeast of Gilroy to several customers along Hecker Pass Road. The system operated sporadically for about 20 years.

In 1999, the District and the SCRWA entered into a Producer and Wholesaler Agreement to take tertiary treated water from the wastewater treatment plant and sell it to local users, including farmers, parks and golf courses. The agreement states that the District owns and operates the distribution facilities up to the point of connection with the SCRWA treatment plant. The agreement requires the District to execute the first phase of capital improvement projects to upgrade the existing distribution facilities to a more reliable, modern recycled-water system. In summer 2002, a new 3 mgd booster pump station in Christmas Hill Park and a 1.5 million gallon reservoir above Eagle Ridge Golf Course commenced operation. The District and SCRWA agreed to work together to create and approve a Master Plan for the design and construction of facilities for the distribution of recycled water in the SCRWA service area. The cost of outside consultants to prepare the master plan was shared by both agencies.

South County Recycled Water Master Plan

The District and SCRWA jointly completed the South County Recycled Water Master Plan in 2004. The master plan defines immediate-, short-, and long-term capital improvement programs. The master plan is to be updated every five years.

With the successful operations of the recycled water facility, a number of satisfied recycled water customers are requesting additional volume. After a satisfactory experience using recycled water in its cooling towers, Calpine requested an additional 1,200 gallons per minute of recycled water for its cogeneration plant. A local farmer, after many years growing various crops with recycled water, is requesting more water to start farming on a fallow field. Additionally, the historic Gilroy Golf Course and the newly constructed Gilroy Sports Park will significantly add more demand on the existing recycled water system.

Responding to these new demands, the District and SCRWA jointly implemented the immediate-term phase of the improvements recommended in the Master Plan. The improvements included the following components:

- 4,800 feet of 20-inch distribution pipelines
- 3 million gallon reservoir
- 3 million gallon per day pump station
- 6 million gallon per day media filter

The joint project is scheduled to receive a grant from the California State Water Resources Control Board to offset 25 percent of the total project cost for these immediate-term improvements.

This joint project was completed in the summer of 2006. Immediately upon the project completion, the local farmer started cultivating the existing farmland with recycled water. The farmer also doubled the original farmland capacity by expanding to the next fallow field. These were all made possible by the increased capacity of the recycled water distribution system.

Desalination:

Bay Area Regional Desalination Project

The Bay Area's four largest water agencies, East Bay Municipal Utility District, the San Francisco Public Utilities Commission, Contra Costa Water District and the Santa Clara Valley Water District, are jointly exploring development of regional desalination facilities which would benefit 5.4 million Bay Area residents and businesses. The Bay Area Regional Desalination Project may consist of one or more desalination facilities with an ultimate total capacity of up to 65 million gallons per day. The regional desalination project would:

- Provide replacement sources of water during emergencies such as earthquakes
- Provide a supplemental supply source during extended drought periods
- Allow other major facilities, such as treatment plants, transmission mains and pump stations, to be taken out of service for an extended period of time for maintenance or repairs
- Increase the diversity of the agencies' water supply portfolio by providing a full-time supplemental water supply, which would increase reliability

In October 2003, the regional partner agencies completed a Phase 1 pre-feasibility study that evaluated the construction of regional desalination facilities.

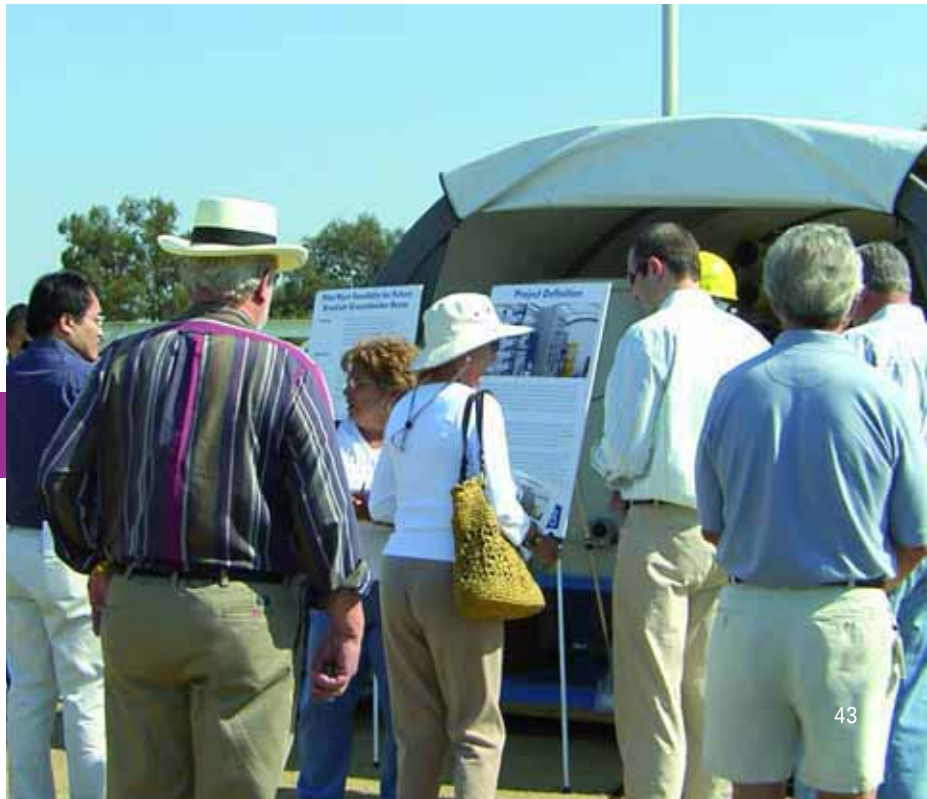
Site selection for a desalination plant is one of the most important decisions in the development process as it may have a substantial impact on cost, schedule and potential environmental effects. Opportunities to locate near power plants and bay discharge sites were sought, since they offer potential power savings, brine dilution opportunities and other environmental benefits. The Phase 1 pre-feasibility study concluded that there are several locations in the Bay Area where a regional desalination facility could be located without any fatal flaws. A systematic preliminary screening of potential Bay Area sites was performed, and a two-step screening process narrowed the list of potential sites from over 20 to 13 and then to 3. The three Santa Clara County brackish groundwater sites fell

off the top rankings because their yields were very small from a regional supply perspective. The three sites that ranked highest were:

- Mirant Pittsburg power plant, Pittsburg (east Contra Costa site)
- Near Bay Bridge, Oakland
- Oceanside, San Francisco

The analysis is being refined as part of the feasibility study. Siting a regional desalination plant presents many regulatory and technical challenges. Cooperation of the four partner agencies in this effort will enhance the project's chances of success. Depending on the preferred facility locations and capacities, construction of additional pipelines and pump stations may be necessary. The Phase 2 pre-feasibility study will be conducted to further evaluate the three sites identified in the Phase 1 pre-feasibility study to better define the desalination project facilities. The planned uses of the product water by each of the agencies, the institutional arrangements between the agencies, geotechnical and hazardous waste reconnaissance, preliminary environmental screening, and the conceptual engineering design of the treatment facilities will be conducted.

The preliminary project cost for facilities to deliver up to 65 million gallons per day is estimated at $200 million to $500 million, depending on the location and capacity of the facilities. This roughly translates into a transfer/potable water cost of approximately $500–$1,200 per acre-foot. Costs will be refined after completion of environmental review and selection of preferred project locations and capacities. The cost-share arrangements for the project will be based on the respective benefits received by the four agencies and by any other parties that may be identified as potential partners and beneficiaries.



Brackish water desalination pilot plant open house in Gilroy.

Potential sites for the Bay Area Regional Desalination Project.

Accomplishment

In mid-2005, the partners were informed that the project will receive $250,000 from state Proposition 50 funds to complete the feasibility study portion of the project. This represents 50 percent of its total cost. The partners also applied for a State grant for the pilot phase of the work. In June 2006, the partners were notified that this project will received nearly $1 million for the pilot phase, which again represents approximately 50 percent of the project cost. This regional partnership was able to leverage common interests and local cost shares per agency to apply and receive grants. The partners are also seeking grants from the Federal Water Resources Development Act.

Once piloting is completed and estimates are obtained for permitting, outreach, construction, operations and maintenance costs, the elected boards of participating agencies will then decide how to proceed. If a specific project is selected, necessary inter-agency agreements will be developed to finance, design, build and operate the facilities.

Next Steps

- Piloting at one site (one year)
- Environmental study and public outreach
- Final design and construction

A detailed feasibility study is currently being conducted and will be completed by December 2006/January 2007. Piloting and limited environmental studies will be conducted as the next steps (estimated to cost approximately $2 million). State and federal funding will be sought for future phases of the regional project. This level of effort is needed to provide more information on potential benefits, location and type of facilities, appropriate technologies, environmental impacts, and to estimate costs of the various options. Public outreach is taking place during the feasibility study phase of the project and will expand during the environmental and pilot portion of the study. The web site for this project can be found at www.RegionalDesal.com.

REGIONAL BRACKISH WATER DESALINATION PROJECT

The San Benito County Water District and the Santa Clara Valley Water District have recently entered into a Memorandum of Understanding to study opportunities for improving water supply efficiencies and reliability within the Pajaro River watershed. Both agencies also executed a Memorandum of Understanding to conduct a joint brackish water desalination project.

The Pajaro River drains San Benito County and the southern portion of Santa Clara County. In addition to this common watershed, the agencies share an imported water supply via the Central Valley Project's San Felipe System (CVP). Although the upper Pajaro River Watershed already offers each of the agencies a local groundwater supply to complement their CVP imported supply, several pockets of historically poor quality groundwater lie within the watershed, unusable to either of the agencies as a municipal and industrial (M&I) water supply. As one strategy to complement their CVP supply with a reliable local source, these agencies are interested in conducting a feasibility study to investigate a brackish groundwater desalination facility in the region. A groundwater desalination facility in this region may be feasible, considering the value of supply reliability that it brings to the area. Other benefits that it would provide are:

- Groundwater level management
- Reducing the need for water softeners in the service area
- Enabling M&I effluent to be used as an alternative agricultural irrigation supply, thereby offsetting additional CVP demand
- An effluent management option for local agencies to relieve further salt loading of the basin

Below: Equipment used in the Brackish Water Desalination Pilot Project.

Top left: Brackish water desalination equipment. Center: Advisory committee tour of the Brackish water desalination pilot plant in Gilroy. Right: Ray Wong explains the reverse osmosis equipment.

Project Setting

The Regional Brackish Water Desalination Project is a feasibility study that will examine options for the desalination of brackish groundwater for municipal and industrial (M&I) use in the San Juan groundwater basin, an area within the upper Pajaro River watershed with well documented, high salinity. Two municipalities, the City of Hollister and the City of San Juan Bautista, are near the San Juan groundwater basin, and could use demineralized groundwater from this basin to supplement their existing M&I supplies

Project Goals and Objectives

The feasibility study has four main goals:

- Evaluate the feasibility and cost-effectiveness of treating brackish groundwater for potable use
- Assess different treatment technologies and brine management methods to provide the highest level of benefits possible to the project partners
- Analyze the groundwater quality and depth in multiple locations to determine the optimum site for the groundwater extraction wells and corresponding desalination system
- Quantify the offset of CVP water due to the use of local groundwater as a new, alternative potable water source

In addition, the feasibility study will provide a basis to determine whether groundwater desalination is a viable method to provide an alternative potable water supply to users in the San Juan basin. The results of this study will allow the work performed at this site to be used as a demonstration site for other inland, brackish groundwater treatment locations.

Accomplishment

In mid-2005, this project was identified by the California Department of Water Resources to receive $245,000 from Proposition 50 grant funds for the $490,000 feasibility study.

Schedule

This project is scheduled for completion in early 2007.

Water Recycling and Desalination:

EDUCATION & OUTREACH

Networking with cities and wastewater treatment plants
The District networks with area cities and wastewater treatment plants to ensure the costs of future water supply and sewage treatment are contained to provide the most efficient use of resources for the community. The District also provides staff support for its Water Retailers Recycling Subcommittee, Agricultural Water Advisory Committee and Landscape Advisory Committee. Staff members also track technical and regulatory developments that affect the production and use of recycled water, and participate in statewide recycling organizations and activities.

Energy Workshop
In August 2005, the District co-sponsored a one-day workshop with the California Department of Water Resources, titled Energy for Water and Wastewater Agencies, which served as a showcase for the linkage between energy conservation and water supply management. Speakers from state and local agencies presented information on energy conservation issues and solutions for water agencies.

Internal Outreach
The District provided a brown-bag presentation to District staff on water recycling. The presentation included information on the benefits of using recycled water and a panel of speakers to speak on how water recycling is part of the District's water supply management objectives.

Bay Area Regional Desalination Project
Along with presentations at agency meetings and at public forums, this project also has a web site at www.RegionalDesal.com.

Above: Ray Wong demonstrates the recycled water treatment process during the Guadalupe Park grand opening festivities. Left: District's WUE program staff speak on Water Recycling at the June 2006 brown bag presentation to the District.

Water Recycling and Desalination:

Grants & Cost-Sharing Agreements

FY 04/05 and 05/06 years were successful grant revenue years for the District. Funding from the California Department of Water Resources (DWR). Proposition 50 grant totaled $122,000 for water recycling and desalination projects and studies. The District's WUE program is conducting many different projects this year. These projects include:

- Water Softener Program (full scale):
  After the successful pilot program, the District and San Benito County Water District jointly applied and were awarded a grant of $300,000 from DWR to further the replacement of old, inefficient water softeners
- Impact Evaluation of Stream Flow Augmentation with Tertiary Recycled Water: DWR Grant through MWD
- EPA II Desalination Research Grant through MWD: Low-Fouling Membrane Pilot Study
- Brackish Groundwater Desalination Feasibility Study:
  Proposition 50 grant
- Bay Area Regional Desalination Project:
  Proposition 50 grant (for feasibility phase and also for pilot phase)
- South County Immediate-Term Construction Project:
  Proposition 50 grant

District Director Rosemary Kamei at a ribbon cutting ceremony at Gilroy Sports Park, which is irrigated with recycled water from a jointly-funded program between the District and the City of Gilroy.

Water Recycling and Desalination: STUDIES & RESEARCH

District governance policies call for the expansion of water recycling in Santa Clara County, while at the same time ensuring that groundwater basins are protected from threats of contamination. To fulfill these goals, the District is working to identify new markets and uses for recycled water, while also conducting research to evaluate the effects that existing and planned recycled water projects may have on groundwater quality. While recycled water is currently used for large landscape irrigation, agriculture, and some industrial processes, it may also have uses for environmental purposes, such as enhancing stream flows, reservoirs and wetlands. Advanced treated recycled water is under consideration for future groundwater recharge. Expanding recycled water applications will require increased monitoring of soil and groundwater quality, as well as advanced levels of treatment depending on where and how recycled water is used.

Research will also investigate treatment methods to expand water recycling options and protect groundwater. Current research studies and recently completed research studies are described below.

Characterization of Salinity Contributions in Sewer Collection and Reclaimed Water Systems

The District participated in this nationwide study to determine the amounts of salt contributed to reclaimed water systems by different sectors, specifically residential users, restaurants and industrial/commercial operations. The study provides best-management practices to control salinity coming into a wastewater treatment plant. The final report was published in 2006 by AWWA/Water Resuse Association.

Advanced Treatment Project: Electrodialysis Reversal/ Reverse Osmosis (EDR/RO) Comparison Pilot Study

The District developed agreements with the City of San José and Metropolitan Water District of Southern California to support (via a California Energy Commission grant) and participate in a study to investigate the desalination capabilities of reverse osmosis and electrodialysis equipment, focusing on the removal of dissolved solids from recycled water. The study demonstrated the technical feasibility of advanced water treatment, and provided detailed cost data useful in planning for larger treatment works. The project was completed in early 2005, and the final report was accepted by the California Energy Commission. The completed final report was also distributed to recycled water purveyors for information sharing.

Next Steps in Advanced Treatment

The District and the City of San José worked together throughout 05/06 in planning for a 5 mgd advanced treatment facility to improve recycled water quality for expanded uses, as well as to take the first step towards future groundwater recharge projects.

Low-Fouling Membrane Pilot Study

The District is the recipient of an EPA grant to perform a pilot study to evaluate the performance of low fouling reverse osmosis (RO) membranes with varied pretreatment of tertiary treated recycled water. The effectiveness of RO is dependent in large part on the type of pretreatment applied to the source water. The use of microfiltration (MF) as a pretreatment for RO has proven effective, but expensive. It is feasible that low-fouling RO membranes could operate successfully when integrated into the existing local treatment facilities by using tertiary treated water as the sole pretreatment for RO. The cost savings of eliminating MF will significantly improve the likelihood of future, full-scale, advanced treated recycled water projects in Santa Clara County. (Timeline: May 2005 to December 2007)

All sites considered as part of initial desalination project studies.

Bay Area Regional Desalination Project

The four largest San Francisco Bay Area water suppliers (SCVWD, EBMUD, SFPUC, CCWD) have established a partnership to evaluate the feasibility of a regional desalination plant to provide water for 5.4 million residents to meet water supply reliability and emergency needs. The joint venture began in 2003, and the partnership completed the pre-feasibility work. The study participants were recent joint recipients of $249,950 Proposition 50 funds to conduct an approximately $500,000 feasibility study. The four agencies will also receive almost $1 million towards the next pilot phase of this project.

Pajaro Watershed Brackish Groundwater Desalination Feasibility Study

The District and San Benito County Water District are the joint recipients of $245,000 in Proposition 50 grants to conduct a $490,000 brackish water feasibility study in the Pajaro River basin. A Memorandum of Under-standing (MOU) between both agencies was executed in 2005/06 to jointly conduct this study.

WUE Unit interns collect water samples at Gilroy's waste-water treatment plant.

Palo Alto/Mountain View Solutions Project

This project is evaluating the limits to the sustainable use of recycled water for landscape irrigation. Soil from Mountain View and from throughout the county is being tested at UC Davis against water samples varying in sodium and total salt concentration to determine the effects of the water on soil structure.

The project has also engaged researchers in the horticulture department at UC Davis to determine the sodium and chloride tolerances of Coast redwoods, the city tree of Mountain View and a highly sensitive species. When the investigatory part of the project is complete, the District will formulate site-specific, best-management practices for recycled water use in Santa Clara Valley.

Research Studies with Stanford University

In FY 05/06, the District and Stanford University, continued working on two grant-financed research studies entitled The Feasibility of Brackish Groundwater Reuse and Impact Evaluation of Streamflow Augmentation with Tertiary Recycled Water. The two grant projects have secured state grants from the California Department of Water Resources through the Desalination Research and Innovation Partnership (DRIP) administered by the Metropolitan Water District of Southern California.

(A) The Feasibility of Brackish Groundwater Reuse

This project will investigate the feasibility of implementing brackish groundwater reuse in Santa Clara County to supplement expected shortages in future supplies of potable water. It will have the potential to identify a new source of supply, and will demonstrate the technical and economic feasibility of treating brackish groundwater with state of-the-art-technology to a quality suitable for beneficial uses. (Timeline: December 2003 to December 2006)

(B) Impact Evaluation of Stream Flow Augmentation with Tertiary Recycled Water

This project will determine whether augmenting stream flow with tertiary-treated, dechlorinated, recycled water in the Coyote Creek watershed is feasible within economic, environmental and countywide policy objectives for water supply management. The primary objective is to evaluate the impact to the water quality of stream, surface water and groundwater. The results from this study will permit future decisions for recycled water based on up-to-date scientific research, including developing future plans or studies for stream flow augmentation. In FY 05/06, the District completed a baseline monitoring program to characterize existing conditions. The District is conducting the CEQA work to issue a Mitigated Negative Declaration for this project and will be applying for the necessary permits to release recycled water into Upper Silver Creek. The District held a stakeholder meeting in July 2006 to present information to stakeholders and to discuss issues and comments on the project's environmental impacts.

n-Nitrosodimethylamine (NDMA) Fate and Transport

NDMA is a carcinogen sometimes found in recycled water. The District participated in a statewide study conducted by a leading research team headed by Dr. David Sedlak of UC Berkeley. The primary objectives of the project were to understand the fate and transport of NDMA in soil and groundwater when recycled water is used for spray irrigation and indirect and/or direct groundwater recharge. These have been accomplished by documenting and assessing current fate and transport data, along with field and laboratory experiments. One local site in Santa Clara County was part of the study.

The research project employed a combination of laboratory and field studies to address the attenuation of NDMA, and to identify the responsible mechanisms. Laboratory experiments were conducted to quantify physical removal (i.e., volatilization from soil after landscape irrigation), chemical transformation (e.g., transformation in survey water conveyance systems, in ponds used for irrigation storage, and in spreading basins used for groundwater recharge) and biotransformation (e.g., metabolism by soil bacteria). Predictions from laboratory experiments were tested by comparison with soil column studies and data collected at field sites where water reuse is practiced. Results from the laboratory experiments, column studies, test plot studies and field measurements were integrated into a final report to present the study results. One desired outcome of the study is to provide practitioners of water reuse with recommendations to minimize the potential for contamination of groundwater with NDMA. This work was funded by the Water Reuse Foundation.

Groundwater Monitoring

The District continually monitors groundwater quality, and is expanding its monitoring network to target areas where recycled water is used for irrigation. The monitoring data will be used to detect and correct problems early on, before they have a chance to develop.

Left: District staff collects water samples for the Streamflow Augmentation Project.
Middle: District staff collects temperature data for Streamflow Augmentation Project.
Right: District and Stanford staff install equipment to monitor stream-groundwater interaction.

Santa Clara Valley Water District

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